IJPSR (2025), Volume 16, Issue 8 **(Research Article)**

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 01 July 2025; received in revised form, 25 July 2025; accepted, 30 July 2025; published 01 August 2025

A RETROSPECTIVE STUDY ON THE PATTERNS OF CERVICAL PAP SMEAR FINDINGS IN DIABETIC AND NON-DIABETIC WOMEN AT A TERTIARY CARE HOSPITAL

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Keywords:

ASCUS- Atypical squamous cell of undetermined significance, ASC-H – atypical squamous cell-cannot exclude HSIL, LSIL-Low grade squamous intraepithelial lesion, HSIL- High grade squamous intraepithelial lesion, diabetes

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ABSTRACT: Introduction: Carcinoma cervix is one of the most common cancers accountings for 15% of all the cancers diagnosed in women. Diabetes mellitus is considered a main factor that increases the propensity to get genital infections, especially when uncontrolled. This analysis allowed us to identify an intriguing pattern that opens up new avenues for investigation. **Aims and Objectives:** To study the PAP smear findings among diabetic females who visited the OPD for various complaints and routine check-ups as well. **Material and Method:** A total cases of 1800 pap smears from women between age group of 25 to 80, for the period of 1 year were included in this study. **Results:** Out of 1800, 1308 were diabetic and 492 were nondiabetic. Among patients we found that the incidence of LSIL, HSIL, Ca-Cervix are higher in diabetic women than non-diabetic women. **Conclusion:** The study's findings demonstrated a correlation between diabetes mellitus and abnormal pap smear tests, and they also indicated that managing diabetes mellitus is a significant factor influencing pap smear results. Furthermore, diabetes raises the risk of cervical cellular alterations in diabetic women.

INTRODUCTION: Cervical lesions, ranging from benign inflammatory changes to pre-cancerous and malignant conditions, pose a significant public health concern for women globally [1]. Carcinoma of the cervix remains one of the most commonly diagnosed cancers among women, accounting for approximately 15% of all female cancer cases [1, 2]. Several risk factors contribute to the development of cervical lesions, including chronic infections, prolonged inflammation, and systemic health conditions such as diabetes mellitus (DM) [2, 3].

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.16(8).2424-29

This article can be accessed online on www.ijpsr.com

DOI link: https://doi.org/10.13040/IJPSR.0975-8232.16(8).2424-29

This study aims to explore the association between diabetes and the prevalence of cervical lesions, with glycemic control evaluated through fasting blood glucose, postprandial blood sugar (PPBS), and HbA1c levels. The classification of cervical cytological abnormalities was done in accordance with the Bethesda System, offering a standardized approach to the interpretation of Pap smear findings in the studied population [4].

Aims and Objectives:

1. To compare the cytologic findings of cervical PAP smear between diabetic and non-diabetic women.
2. To assess the association between diabetes (based on Fasting blood sugar levels & PPBS and HbA1c levels) and the development of different types of cervical lesions.

MATERIALS AND METHODS:

Study Design and Setting:

- This was a retrospective case control study conducted at the Department of Pathology in conjunction with Obstetrics and Gynecology in Gauhati Medical College and Hospital.
- The data was collected from medical records of women who underwent cervical Pap smear screening over a period of one year (Jan 2023 to Dec 2023).

Study Population: A total of 1,800 women who underwent Pap smear screening were included in the study.

METHODOLOGY

- Data Collection:
- Data were collected from hospital records, including:
- Pap smear results classified according to the Bethesda system.
- Diabetes status:
- Women were classified as diabetic if their-
    - FBS>126 mg/dL
    - PPBS>200 mg/dL
    - HbA1c >6.5%.
- Non-diabetic women, if their-
    - FBS<126 mg/dL
    - PPBS<200 mg/dL
    - HbA1c <than 5.7%.

Inclusion Criteria:

1. Women aged 21-65 years who underwent Pap smear screening (Acc. To ACOG, 2021 guidelines) [1].
2. Women with complete medical records and cytology results.

Exclusion Criteria:

1. Pregnant women.
2. Women with a history of cervical cancer or who had undergone treatment for cervical malignancy.
3. Women with HIV or other immuno-compromised conditions.

Statistical Analysis:

- Odds ratios (OR), Relative Risk (RR) and p-value were calculated to assess the strength and significance of the association.
- A p-value of < 0.05 was considered statistically significant.
- Chi-square test was used to evaluate the association between diabetes and cervical lesion categories.

RESULTS:

- Total patients: 1800
- Diabetic women: 1308 (72%)
- Non –diabetic women: 492 (27%)

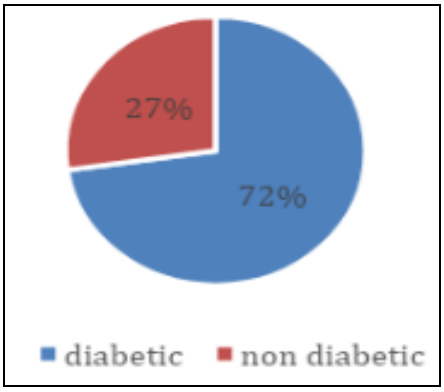

FIG. 1: DISTRIBUTION OF CASES AMONG DIABETIC AND NON-DIABETIC WOMEN

TABLE 1: DISTRIBUTION OF CASES AMONG DIABETIC AND NON-DIABETIC WOMEN

Cytology Findings	Diabetic (n=1308)	Non-Diabetic (n=492)
Unsatisfactory for evaluation	107 (8.18%)	64 (3.56%)
NILM	788 (60.24%)	341 (69.31%)

ASC-US	97 (7.41%)	17 (3.46%)
ASC-H	64 (4.89%)	12 (2.44%)
LSIL	94 (7.19%)	22 (4.47%)
HSIL	88 (6.73%)	14 (2.85%)
Squamous Cell Carcinoma	37 (2.83%)	5 (1.02%)
Adenocarcinoma	27 (2.06%)	1 (0.20%)
AGC-NOS	21 (1.6%)	1 (0.20%)

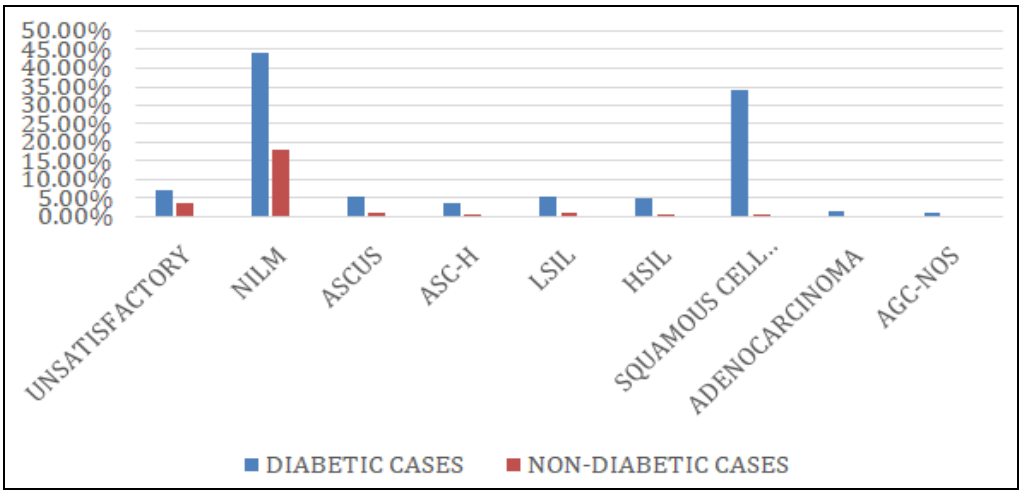

FIG. 2: BAR DIAGRAM SHOWING DISTRIBUTION OF CASES AMONG DIABETIC AND NON-DIABETIC WOMEN

TABLE 2: SUBCATEGORIZATION OF NILM FINDINGS

NILM Subcategory	Diabetic (n=788)	Non-Diabetic (n=341)
Inflammatory	400 (50.76%)	140 (41.00%)
Atrophic	210 (26.65%)	40 (11.73%)
Reactive	107 (13.59%)	190 (55.71%)
Trichomonas	36 (4.57%)	5 (1.47%)
Candida	55 (6.98%)	10 (2.93%)
Bacterial Vaginosis	39 (4.95%)	20 (5.87%)
Herpes	28 (3.55%)	2 (0.58%)

TABLE 3: ODDS RATIO, RELATIVE RISK, AND P-VALUE FOR CYTOLOGY FINDINGS

Cytology Findings	Odds Ratio	Relative Risk	P-value
Unsatisfactory for evaluation	2.53	2.29	0.02
NILM	0.87	0.92	0.15
ASC-US	1.70	1.65	0.043
ASC-H	2.00	1.96	0.019
LSIL	1.63	1.53	0.048
HSIL	2.40	2.36	0.004
Squamous Cell Carcinoma	1.81	1.76	0.031
Adenocarcinoma	2.38	2.38	0.007
AGC-NOS	2.50	2.35	0.015

TABLE 4: CHI- SQUARE TEST AND DEGREE OF FREEDOM

Cytology Findings	Chi-Square	Degrees of Freedom (df)
Unsatisfactory for evaluation	5.47	1
NILM	4.33	1
ASC-US	6.21	1
ASC-H	8.19	1
LSIL	7.12	1
HSIL	10.25	1
Squamous Cell Carcinoma	5.84	1
Adenocarcinoma	7.15	1
AGC-NOS	5.98	1

Critical value: 3.84

TABLE 5: CHI-SQUARE AND DEGREES OF FREEDOM (SUBCATEGORY-WISE COMPARISONS)

NILM Subcategory	Chi-Square	Degrees of Freedom (df)
Inflammatory	4.76	1
Atrophic	8.32	1
Reactive	3.45	1
Trichomonas	5.12	1
Candida	6.19	1
Bacterial Vaginosis	3.67	1
Herpes	7.45	1

TABLE 6: DISTRIBUTION OF CYTOLOGICAL FINDINGS IN DIABETIC WOMEN BASED ON HBA1C LEVELS AND AUC VALUES

Cytological Findings	Diabetic (n=1308)	HbA1c < 7% (Good Control)	HbA1c ≥ 7% (Poor Control)	AUC Value
NILM	788	405	383	0.60
ASC-US	97	35	62	0.60
ASC-H	64	20	44	0.65
LSIL	94	33	61	0.62
HSIL	88	26	62	0.68
Squamous Cell Carcinoma	37	9	28	0.63
Adenocarcinoma	27	8	19	0.62
AGC-NOS	21	6	15	0.61

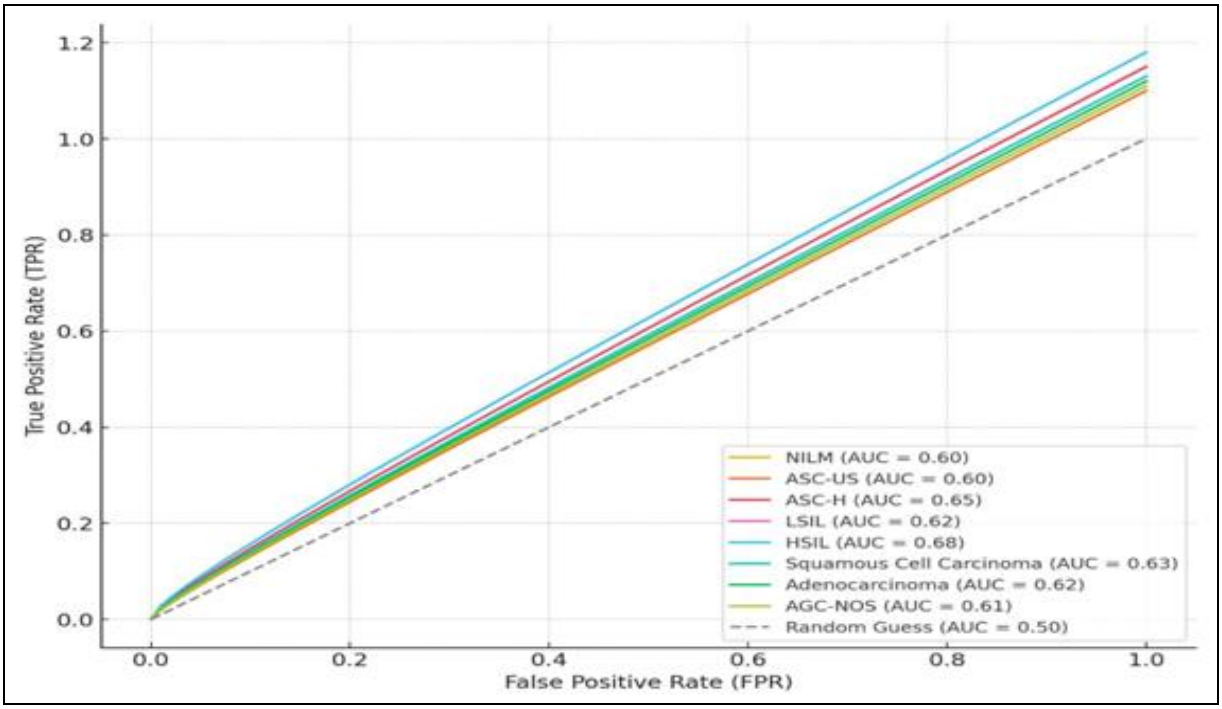

FIG. 3: ROC CURVES FOR CYTOLOGICAL FINDINGS BASED ON HBA1C LEVELS IN DIABETIC WOMEN

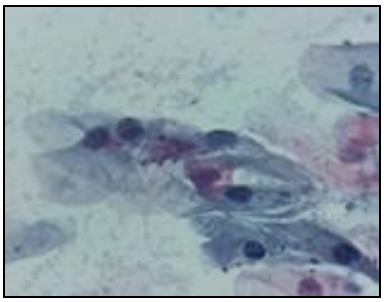

FIG. 4: CANDIA

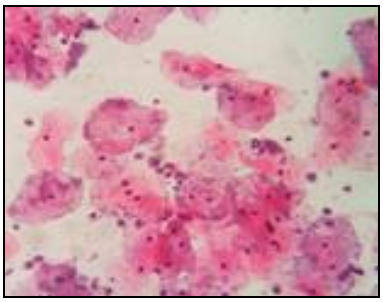

FIG. 5: CLUE CELL

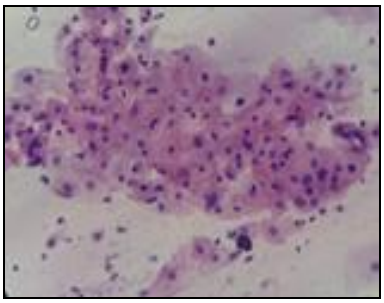

FIG. 6: ASCUS

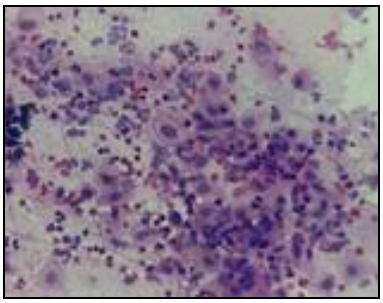

FIG. 7: LSIL

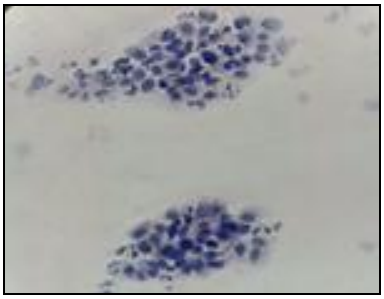

FIG. 8: HSIL

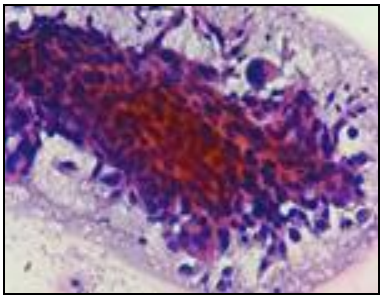

FIG. 9: SCC

DISCUSSION:

- This study reveals that diabetic individuals have significantly higher rates of abnormal Pap smear results, particularly HSIL and squamous cell carcinoma, compared to their non-diabetic counterparts [5, 6].
- The observed increase in these abnormal findings underscores the importance of glycemic control in maintaining cervical health [6].
- Notably, the analysis of Odds Ratios indicates a significantly elevated risk of abnormal cytology among diabetic women [7, 8].
- This correlation suggests that poor glycemic management may exacerbate cervical health risks, consistent with existing literature that highlights the impact of metabolic health on cervical cancer prevention [8, 9].
- Furthermore, we noted a higher prevalence of inflammatory conditions in diabetic women, which indicates that diabetes compromises immune responses, increasing susceptibility to infections and inflammatory processes that contribute to cervical dysplasia [10, 11, 14].
- The statistical analyses strengthen our conclusions, with significant p-values indicating robust associations between diabetes and abnormal Pap smear results [12, 13].
- The chi-square test results further confirm the relationship, reinforcing the necessity of vigilant screening for cervical abnormalities in diabetic population [8, 15].
- The Area Under the Curve (AUC) values also support the notion that glycemic control is a useful indicator for identifying high-risk lesions, particularly HSIL [16].

Limitations:

1. Single-Center Study.
2. Cross-Sectional Design.
3. Lack of HPV Data.
4. Limited Follow-Up.
5. Selection and Recall Bias.

Future Perspectives:

1. Cervical Screening Guidelines for Diabetic Women: Given the significantly higher rates of severe cervical abnormalities in diabetic women, earlier and more frequent Pap smear testing, along with HPV co-testing, should be recommended to detect precancerous lesions early to reduce the progression to invasive cancer.

2. Future research should focus on longitudinal designs to monitor cervical health outcomes in diabetic women, particularly concerning interventions aimed at improving glycemic control.

CONCLUSION:

- In conclusion, this study highlights the significantly elevated risk of cervical abnormalities, including high-grade squamous intraepithelial lesions and squamous cell carcinoma, in diabetic women.
- These findings reinforce the importance of considering diabetes as a critical risk factor in cervical cancer screening protocols.
- By integrating early and frequent screenings with comprehensive diabetes management, healthcare providers can reduce the burden of cervical cancer in diabetic women.
- The insights from this study could pave the way for future guidelines and strategies aimed at improving outcomes for diabetic women at risk of cervical cancer.

IEC approval: This retrospective study was conducted using archived Pap smear data without any direct patient interaction or new sample collection. As per ICMR National Ethical Guidelines (2017), such studies do not require prior IEC approval.

Limitation: Due to some unavoidable technical error, the slides of some cases could not be preserved for future study.

ACKNOWLEDGEMENT: The authors would like to acknowledge all Faculties of Pathology department, GMCH, Guwahati, Assam, India.

CONFLICTS OF INTEREST: The authors declare no conflicts of interest.

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How to cite this article:
Harisha SH, Talukdar L and Aziz N: A retrospective study on the patterns of cervical pap smear findings in diabetic and non-diabetic women at a tertiary care hospital. Int J Pharm Sci & Res 2025; 16(8): 2424-29. doi: 10.13040/IJPSR.0975-8232.16(8).2424-29.